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 DATE: 04/24/2002 P.6  
 TIME: 16:01:35

 RAW SEQUENCE LISTING  
 PATENT APPLICATION: US/09/380,447A

 Input Set : A:\P1581R2.txt  
 Output Set: N:\CRF3\04242002\I380447A.raw

#15

3 <110> APPLICANT: Sidhu, Sachdev S.  
 4 Weiss, Gregory A.  
 5 Wells, James A.  
 7 <120> TITLE OF INVENTION: IMPROVEMENTS IN PHAGE DISPLAY  
 9 <130> FILE REFERENCE: P1581R2  
 11 <140> CURRENT APPLICATION NUMBER: US 09/380,447A  
 12 <141> CURRENT FILING DATE: 1999-09-01  
 14 <150> PRIOR APPLICATION NUMBER: US 60/134,870  
 15 <151> PRIOR FILING DATE: 1999-05-19  
 17 <150> PRIOR APPLICATION NUMBER: US 60/133,296  
 18 <151> PRIOR FILING DATE: 1999-05-10  
 20 <150> PRIOR APPLICATION NUMBER: US 60/103,514  
 21 <151> PRIOR FILING DATE: 1998-10-08  
 23 <150> PRIOR APPLICATION NUMBER: US 60/094,291  
 24 <151> PRIOR FILING DATE: 1998-07-27  
 26 <150> PRIOR APPLICATION NUMBER: PCT/USUS99/16596  
 27 <151> PRIOR FILING DATE: 1999-07-22  
 29 <160> NUMBER OF SEQ ID NOS: 287  
 31 <210> SEQ ID NO: 1  
 32 <211> LENGTH: 50  
 33 <212> TYPE: PRT  
 34 <213> ORGANISM: Artificial sequence  
 36 <220> FEATURE:  
 37 <223> OTHER INFORMATION: Synthetic coat protein  
 39 <220> FEATURE:  
 40 <221> NAME/KEY: unsure  
 41 <222> LOCATION: 12-30  
 42 <223> OTHER INFORMATION: unknown amino acid  
 44 <400> SEQUENCE: 1  
 W--> 45 Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Xaa Xaa Xaa Xaa  
 46 1 5 10 15  
 W--> 48 Xaa  
 49 20 25 30  
 51 Glu Thr Ala Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro  
 52 35 40 45  
 54 Asp Asp Gly Glu Ala  
 55 50  
 57 <210> SEQ ID NO: 2  
 58 <211> LENGTH: 50  
 59 <212> TYPE: PRT  
 60 <213> ORGANISM: M13 phage  
 62 <220> FEATURE:  
 W--> 63 <221> NAME/KEY: M13 phage

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64 <222> LOCATION: 1-50  
 65 <223> OTHER INFORMATION: coat protein VIII  
 67 <400> SEQUENCE: 2  
 68 Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asn Ser Leu Gln  
 69 1 5 10 15  
 71 Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val  
 72 20 25 30  
 74 Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe  
 75 35 40 45  
 77 Thr Ser Lys Ala Ser  
 78 50  
 80 <210> SEQ ID NO: 3  
 81 <211> LENGTH: 50  
 82 <212> TYPE: PRT  
 83 <213> ORGANISM: f1 phage  
 85 <220> FEATURE:  
**W--> 86 <221> NAME/KEY: f1 phage**  
 87 <222> LOCATION: 1-50  
 88 <223> OTHER INFORMATION: coat protein VIII  
 90 <400> SEQUENCE: 3  
 91 Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln  
 92 1 5 10 15  
 94 Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val  
 95 20 25 30  
 97 Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe  
 98 35 40 45  
 100 Thr Ser Lys Ala Ser  
 101 50  
 103 <210> SEQ ID NO: 4  
 104 <211> LENGTH: 50  
 105 <212> TYPE: PRT  
 106 <213> ORGANISM: fd phage  
 108 <220> FEATURE:  
**W--> 109 <221> NAME/KEY: fd phage**  
 110 <222> LOCATION: 1-50  
 111 <223> OTHER INFORMATION: coat protein VIII  
 113 <400> SEQUENCE: 4  
 114 Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln  
 115 1 5 10 15  
 117 Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val  
 118 20 25 30  
 120 Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe  
 121 35 40 45  
 123 Thr Ser Lys Ala Ser  
 124 50  
 126 <210> SEQ ID NO: 5  
 127 <211> LENGTH: 50  
 128 <212> TYPE: PRT  
 129 <213> ORGANISM: Zj-2 phage

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131 <220> FEATURE:  
W--> 132 <221> NAME/KEY: Zj-2 phage  
133 <222> LOCATION: 1-50  
134 <223> OTHER INFORMATION: coat protein VIII  
136 <400> SEQUENCE: 5  
137 Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln  
138 1 5 10 15  
140 Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val  
141 20 25 30  
143 Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe  
144 35 40 45  
146 Ala Ser Lys Ala Ser  
147 50  
149 <210> SEQ ID NO: 6  
150 <211> LENGTH: 50  
151 <212> TYPE: PRT  
152 <213> ORGANISM: Ifl phage  
154 <220> FEATURE:  
W--> 155 <221> NAME/KEY: Ifl phage  
156 <222> LOCATION: 1-50  
157 <223> OTHER INFORMATION: coat protein VIII  
159 <400> SEQUENCE: 6  
160 Asp Asp Ala Thr Ser Gln Ala Lys Ala Ala Phe Asp Ser Leu Thr  
161 1 5 10 15  
163 Ala Gln Ala Thr Glu Met Ser Gly Tyr Ala Trp Ala Leu Val Val  
164 20 25 30  
166 Leu Val Val Gly Ala Thr Val Gly Ile Lys Leu Phe Lys Lys Phe  
167 35 40 45  
169 Val Ser Arg Ala Ser  
170 50  
172 <210> SEQ ID NO: 7  
173 <211> LENGTH: 50  
174 <212> TYPE: PRT  
175 <213> ORGANISM: I2-2 phage  
177 <220> FEATURE:  
W--> 178 <221> NAME/KEY: I2-2 phage  
179 <222> LOCATION: 1-50  
180 <223> OTHER INFORMATION: coat protein VIII  
182 <400> SEQUENCE: 7  
183 Ser Thr Ala Thr Ser Tyr Ala Thr Glu Ala Met Asn Ser Leu Lys  
184 1 5 10 15  
186 Thr Gln Ala Thr Asp Leu Ile Asp Gln Thr Trp Pro Val Val Thr  
187 20 25 30  
189 Ser Val Ala Val Ala Gly Leu Ala Ile Arg Leu Phe Lys Lys Phe  
190 35 40 45  
192 Ser Ser Lys Ala Val  
193 50  
195 <210> SEQ ID NO: 8  
196 <211> LENGTH: 50

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197 <212> TYPE: PRT  
198 <213> ORGANISM: Ike phage  
200 <220> FEATURE:  
W--> 201 <221> NAME/KEY: Ike phage  
202 <222> LOCATION: 1-50  
203 <223> OTHER INFORMATION: coat protein VIII  
205 <400> SEQUENCE: 8  
206 Asn Ala Ala Thr Asn Tyr Ala Thr Glu Ala Met Asp Ser Leu Lys  
207 1 5 10 15  
209 Thr Gln Ala Ile Asp Leu Ile Ser Gln Thr Trp Pro Val Val Thr  
210 20 25 30  
212 Thr Val Val Val Ala Gly Leu Val Ile Arg Leu Phe Lys Lys Phe  
213 35 40 45  
215 Ser Ser Lys Ala Val  
216 50  
218 <210> SEQ ID NO: 9  
219 <211> LENGTH: 30  
220 <212> TYPE: DNA  
221 <213> ORGANISM: Artificial sequence  
223 <220> FEATURE:  
224 <223> OTHER INFORMATION: oligonucleotide primer  
226 <400> SEQUENCE: 9  
227 aaaagaattc ccgacaccat cgaatggtgc 30  
229 <210> SEQ ID NO: 10  
230 <211> LENGTH: 35  
231 <212> TYPE: DNA  
232 <213> ORGANISM: Artificial sequence  
234 <220> FEATURE:  
235 <223> OTHER INFORMATION: oligonucleotide primer  
237 <400> SEQUENCE: 10  
238 accagatgca taagccgagg cgaaaaacat catcg 35  
240 <210> SEQ ID NO: 11  
241 <211> LENGTH: 56  
242 <212> TYPE: DNA  
243 <213> ORGANISM: Artificial sequence  
245 <220> FEATURE:  
246 <223> OTHER INFORMATION: oligonucleotide primer  
248 <400> SEQUENCE: 11  
249 ttttctagac aggccctcca ccagatgcat aagccgaggc ggaaaaacatc 50  
251 atcgta 56  
253 <210> SEQ ID NO: 12  
254 <211> LENGTH: 34  
255 <212> TYPE: DNA  
256 <213> ORGANISM: Artificial sequence  
258 <220> FEATURE:  
259 <223> OTHER INFORMATION: oligonucleotide primer  
261 <400> SEQUENCE: 12  
262 gctatcgaa tgcatacgaa atcaccggca cctg 34  
264 <210> SEQ ID NO: 13

RAW SEQUENCE LISTING  
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Input Set : A:\P1581R2.txt  
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265 <211> LENGTH: 61  
266 <212> TYPE: DNA  
267 <213> ORGANISM: Artificial sequence  
269 <220> FEATURE:  
270 <223> OTHER INFORMATION: oligonucleotide primer  
272 <400> SEQUENCE: 13  
273 gagtcatagt cgtcaggcgc ctcctccgga tcctccaccc accttggta 50  
275 aggtgtcgta g 61  
277 <210> SEQ ID NO: 14  
278 <211> LENGTH: 18  
279 <212> TYPE: DNA  
280 <213> ORGANISM: Artificial sequence  
282 <220> FEATURE:  
283 <223> OTHER INFORMATION: oligonucleotide primer  
285 <400> SEQUENCE: 14  
286 gggtatctag aggttgag 18  
288 <210> SEQ ID NO: 15  
289 <211> LENGTH: 46  
290 <212> TYPE: DNA  
291 <213> ORGANISM: Artificial sequence  
293 <220> FEATURE:  
294 <223> OTHER INFORMATION: oligonucleotide primer  
296 <400> SEQUENCE: 15  
297 tggagctccc ggatcctcca ccgctctgga agccacagct gccctc 46  
299 <210> SEQ ID NO: 16  
300 <211> LENGTH: 42  
301 <212> TYPE: DNA  
302 <213> ORGANISM: Artificial sequence  
304 <220> FEATURE:  
305 <223> OTHER INFORMATION: mutagenic oligonucleotide  
307 <400> SEQUENCE: 16  
308 ggatccggga gctccagctg atgaggtgac gatcccgaa aa 42  
310 <210> SEQ ID NO: 17  
311 <211> LENGTH: 42  
312 <212> TYPE: DNA  
313 <213> ORGANISM: Artificial sequence  
315 <220> FEATURE:  
316 <223> OTHER INFORMATION: mutagenic oligonucleotide  
318 <400> SEQUENCE: 17  
319 gatcccgcaa aagccgcctg atgatccctg caaggctcag cg 42  
321 <210> SEQ ID NO: 18  
322 <211> LENGTH: 42  
323 <212> TYPE: DNA  
324 <213> ORGANISM: Artificial sequence  
326 <220> FEATURE:  
327 <223> OTHER INFORMATION: mutagenic oligonucleotide  
329 <400> SEQUENCE: 18  
330 caaggcctcag cgaccgaatg atgaggatgat gcgtggcga tg 42  
332 <210> SEQ ID NO: 19

RAW SEQUENCE LISTING ERROR SUMMARY  
PATENT APPLICATION: US/09/380,447A

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Input Set : A:\P1581R2.txt  
Output Set: N:\CRF3\04242002\I380447A.raw

**Please Note:**

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:1; Xaa Pos. 12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30  
Seq#:21; N Pos. 20,22,26,28,31,34,38,41,44,47  
Seq#:22; N Pos. 19,22,26,28,31,35,38,41,44,46  
Seq#:23; N Pos. 19,22,25,28,31,35,38,41,44,47  
Seq#:24; N Pos. 19,22,25,28,31,34,37,38,40,41,43,44  
Seq#:25; N Pos. 19,20,22,23,31,32,34,35,37,38,43,44,46,47  
Seq#:100; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:101; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:102; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35,37,38,40,41,43,44,46  
Seq#:102; N Pos. 47  
Seq#:103; N Pos. 22,23,25,26,28,29,31,32,34,35,37,38,40,41,43,44,46,47,49  
Seq#:103; N Pos. 50  
Seq#:104; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35,37,38,40,41,43,44,46  
Seq#:104; N Pos. 47  
Seq#:105; N Pos. 22,23,25,26,28,29,31,32,34,35,37,38,40,41,43,44,46,47,49  
Seq#:105; N Pos. 50  
Seq#:107; N Pos. 22,25,28,31,34,37,40,43,46,49,52,55,58,61,64,67,70,73,76  
Seq#:121; Xaa Pos. 12  
Seq#:125; N Pos. 19,20,22,23,25,26,28,29  
Seq#:126; N Pos. 19,20,22,23,25,26,28,29,31,32  
Seq#:127; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:128; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:129; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:130; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35  
Seq#:131; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35,37,38,40,41  
Seq#:132; N Pos. 19,20,22,23,25,26,28,29,31,32,34,35,37,38,40,41,43,44,46  
Seq#:132; N Pos. 47  
Seq#:139; N Pos. 2,4,8,10,13,17,20,23,26  
Seq#:154; N Pos. 1,4,8,10,13,17,20,23,26,28  
Seq#:181; N Pos. 1,4,7,10,13,16,19,22,25,28  
Seq#:266; N Pos. 1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46,49,52,55

## VERIFICATION SUMMARY

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Input Set : A:\P1581R2.txt

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L:45 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:0  
L:48 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:15  
L:63 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:2  
L:86 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:3  
L:109 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:4  
L:132 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:5  
L:155 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:6  
L:178 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:7  
L:201 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:8  
L:368 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:21 after pos.:0  
L:386 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22 after pos.:0  
L:404 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:23 after pos.:0  
L:422 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:24 after pos.:0  
L:440 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:25 after pos.:0  
L:577 M:220 C: Keyword misspelled or invalid format, <213> ORGANISM for SEQ ID#:36  
L:580 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:36  
L:821 M:220 C: Keyword misspelled or invalid format, <213> ORGANISM for SEQ ID#:56  
L:824 M:257 W: Feature value mis-spelled or invalid, <221> Name/Key for SEQ ID#:56  
L:1347 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:100 after pos.:0  
L:1365 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:101 after pos.:0  
L:1384 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:102 after pos.:0  
L:1403 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:103 after pos.:0  
L:1422 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:104 after pos.:0  
L:1441 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:105 after pos.:0  
L:1473 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:107 after pos.:0  
L:1475 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:107 after pos.:50  
L:1650 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:121 after pos.:0  
L:1722 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:125 after pos.:0  
L:1738 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:126 after pos.:0  
L:1756 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:127 after pos.:0  
L:1774 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:128 after pos.:0  
L:1792 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:129 after pos.:0  
L:1810 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:130 after pos.:0  
L:1828 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:131 after pos.:0  
L:1847 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:132 after pos.:0  
L:1934 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:139 after pos.:0  
L:2111 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:154 after pos.:0  
L:2426 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:181 after pos.:0  
L:3449 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:266 after pos.:0  
L:3451 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:266 after pos.:50